Lathe Threading Jig

by Al Crandall

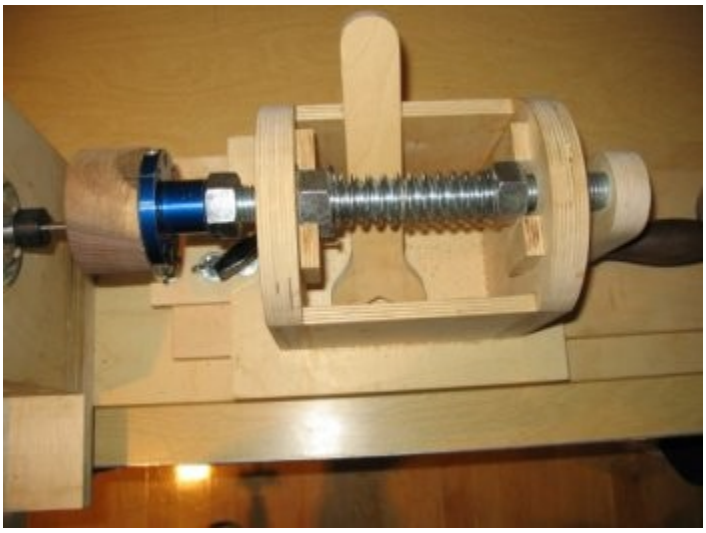
Turners frequently have a need for shop made jigs or fixtures designed to thread onto the spindle of their lathe. While 1"-8 and 1⅛"-8 are probably the most common diameter/pitch combinations, they are not sizes stocked at the local big box. It's often easier and certainly quicker to craft such a thread at home. Here's the tool which will enable you to do so, accurately, quickly, and easily—yielding a nut which will fit your spindle perfectly.

The base of this jig is a torsion box made by gluing a top and bottom skin of ½" baltic birch plywood over a frame of 1" tall strips of ½" plywood. The base is 2" x 9" x 36", and the interior of the box has three rails which divide it into four 9" squares. Centered on the width of the base are two 6" x 24" plys of ½" Baltic birch which have been dadoed to accept a 24" long "T" track aluminum extrusion. This is screwed into place.

Riding on top of this is a sled made of two 9" x 11" layers of plywood. These are held in position by two 1½" x 11" rails glued under the sled edges. This sled needs to slide easily along the platform, but have no slop side to side. Drill both ends of the sled for a bolt which fits the aluminum extrusion so wing knobs can lock the sled in place.

Several people remained after the meeting to see the demonstration of the router powered threading jig. The motor end of the router is visible clamped in its two supports. The big black wingnut near the bottom of the picture screws onto a ⅜" carriage bolt which locks the cross slide in position by pulling a floating section of dovetail up tight against the dovetail lower guide rail.

Cross feed of the router carriage is accomplished by turning the walnut handled crank (bottom of picture above). This turns a ⅜"-16 L.H. all-thread rod which in turn pulls or pushes a L.H. steel nut trapped in the carriage. The cross slide has 4" of travel. This enables the cutting of male threads up to about 7¼" diameter when using a ¾" diameter cutter. Note the plywood open end wrench lying on the table behind the jig (also in picture above).



Directly below the blue faceplate (pic at right) is a small movable stop block with two wingnuts and screws which fit in the "T" track. This stop is necessary so that the 1"-8 spindle carriage can be moved to the right and returned without losing its relationship of the screw pitch to the cutter.

Below the faceplate jam nut is one of the two wing knobs which lock the spindle carriage to the "T" track. The spindle is a 12" long piece of 1"-8 all-thread. It is supported near both ends by a double layer of ½" plywood which have been drilled with a 1" Forstner drill bit.

I wanted to be able to swing a 14" diameter turning on this spindle, so the holes in the supports are not 7" from the bottom of the support, but are 7" up from the top of the "T" track. These end supports are separated by single layers of ply 6" long. Foot print of the spindle support box is 6" wide x just under 8". I did not glue this box to the sled but instead opted to just screw it from the bottom side. This will facilitate installing a different box with a different pitch thread if I decide to switch away from 8 TPI in the future.

Inside the box are two 1"-8 nuts on the all-thread spindle with a spring between them. Both nuts are kept from rotating by tightly fitted "U" shaped pieces of plywood which are glued to the end supports. However, the left side nut is held firmly against its support wall by two washer head screws while the right side nut floats in its plywood housing.

The left nut is essentially the bearing for this spindle while the right nut is pushed by the spring which applies pressure to the spindle and eliminates any possibility of backlash as the spindle is moved through the bearing nut. There probably was little to no backlash in the fit between the all-thread and the nut, but all it took was another nut and a spring to make sure. The plywood wrench in the spindle box fits the nut which backs up the faceplate. The crank arm for the spindle handle is a two ply lamination.

One of the two walnut handles which fit over ¼" carriage bolts and are held on with acorn nuts inside a counterbore on the handle end. Near the handle is one of the demonstration pieces of walnut screwed to a blue faceplate and waiting to be threaded.

Details of the Router Carriage.

The router is fitted into two supports holes for the router were bored to a close fit by using a boring head in the lathe tailstock and mounting the supports in a faceplate jig. The hole was positioned to put the router centerline 7" above the "T" track surface at final assembly. Afterward the supports were split and drilled and counterbored for a carriage bolt clamp. Very little pressure is needed from the clamp bolt to tightly hold the router in place. Two single layer plywood gussets or buttresses keep the support plumb and rigid.

The router carriage rides on a base which is 11½" x 9", two plies thick. The long edge is shown in this photo. Centered on this base is a dovetailed way made of two plies. It is 3½" wide on the top with 30° sides. Make a piece 27" long and cut it into three pieces after cutting the angles on the sides. Make the guide rail which the carriage will ride on 11 ½" long and make two rails 7½" long.

One will be fastened permanently to the back edge of the carriage base as shown in this view and the other will float to act as a lock with the big wing knob. The four black screw heads in this view hold a 1½" x 7½" piece of plywood to keep the floating piece of dovetail from scooting out of position when the wing knob is tightened. I relieved most of the top surface of this floating piece to a depth of 3⁄16" and left a narrow band outboard of the locking screw at the original height to act as

a fulcrum so the floating piece will clamp against the bottom of the main dovetail way.

The ⅜"-16 L.H. threaded rod and the L.H. nuts are from McMaster-Carr. The left hand thread is used to make the rotation of the crank conform with normal machine crank direction. The stock number for the rod is 95626A304, and the cost is $6.91. The nuts are number 95140A127 and are $0.22 each.

Don't forget that there is a third nut in the carriage which is being driven by the allthread. The rod has a flat washer jammed between two nuts, and this washer is also trapped in counterbores between two vertical pieces of plywood, seen here screwed to the end of the dovetail way.

Careful depth control of the counterbores allows the washer to fit well enough that the router cross slide has no backlash in its screw. A double layer of plywood completes the crank for this cross feed screw.

The 7½" x 9" base of the movable carriage is a two layer lamination of ½" plywood, as are the 9" x 11½" main base, the dovetail pieces, the vetical router supports, and the crank. The two pieces which house the feed screw are screwed together and mounted to the end of the dovetail with screws.

Be aware that the ⅜" shank will probably necessitate the use of a collet bushing in the router. Another option would be to buy a 1" diameter cutter which has a ½" diameter shank. This cutter number is 367-7102 from Enco. I know of no source which has a like cutter with ¼" diameter shank.

The cutter shown in the router spindle is a ¾" diameter 60° HSS double angle shank type cutter with a ⅜" diameter shank. It was purchased from Enco. Their model number is 367-7100. On line shopping at www.use-enco.com will get it for $21.24 plus shipping as of this writing.

I chose the Hitachi M12VC router because it

is rated by the manufacturer at 1 3/4 HP, it has a fairly small diameter body, it uses ½" diameter collets, it has variable speed, and it was the least costly model I could find with these features.

Router as seen from the operator's viewpoint.